**Students’ Investigation of a View Tube** by Samuel Obara

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**Abstract:**   
Using multiple representations and technology, students explore the relationship between tube attribute and field of vision.

Given a view tube

How wide is your field of vision when you look through a tube, such as a paper towel tube or a toilet roll tube?

Consider the following variables: The length of the tube, the diameter of the tube, and your distance from your eye to the wall.

1. **Vary the length of the tube**: Investigate the relationship between the length of the view tube (*x*) and the viewable vertical dis­tance on the wall (*y*) while maintaining a perpen­dicular line from the eye to the wall and keeping the diameter of the view tube constant. Use view tubes of different lengths for comparison.

Begin by predicting a mathematical relationship between the length of the tube and the width of your field of vision:

2. **Vary the distance to the wall:** Investigate the relationship between the perpen­dicular distance from the eye to the wall (*x*) and the viewable vertical distance on the wall (*y*) using a view tube of constant length and diameter.

Begin by predicting a mathematical relationship between the distance to the wall and the width of your field of vision:

3. **Vary the diameter of the tube**: Investigate the relationship between the diam­eter of the view tube (*x*) of constant lengths and the viewable vertical distance on the wall (*y*) while keeping the perpendicular distance from the eye to the wall constant. Use view tubes of different diameters for comparison.

Begin by predicting a mathematical relationship between the diameter of the tube and the width of your field of vision:

Data Collection:

Distance eye to the wall: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

Diameter of the tube: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

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| --- | --- |
| Length of the tube (cm) | Vertical viewing distance (cm) |
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Generate a graph:

Construct a mathematical model that describes the relationship between the length of the tube and the vertical viewing distance.

diagram.tiff